

# PATENT SPECIFICATION



839,359

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International Classification:—B01d.

## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

### Improvements in Fluid Filters

I, RAYMOND HERBERT EATON-WILLIAMS, a British Subject of 123 Southwood Lane, Highgate, London, N.6. do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention has reference to improvements in or modifications of the fluid filter and the method of producing a fluid filter as claimed in my Patent Specification No. 781,194.

A filter according to the invention claimed in claim 1 of my said Patent Specification consists of a filter element of flexible fabric, said element including yarns of thermoplastic material to confer permanent pleatable properties upon said element and having multiple pre-formed sinuous folds therein, and an outer frame of casting plastic composition surrounding said element; and the method of making a filter according to the invention claimed in claim 15 of my said Patent Specification comprises flowing a hardening resin composition into the sides in turn of a horizontal frame and allowing said composition to harden in turn to imbed the side edge of filter cloth in that frame side and optionally removing the frame side member, the filter cloth having been previously pleated by a heat-forming operation in accordance with claims 12 and 13 or claims 12 and 14 of my said Patent Specification.

The casting plastic composition included in the said filter and employed in the said method was of a nature such as to harden subsequently to being cast.

In accordance with the present invention, the filter according to claim 1 of my said Patent Specification is improved or modified in that the outer frame surrounding the filter element consists of moulding material having

a flexible or yielding character; and also in accordance with the present invention the method of producing filters as claimed in claim 15 of my said Patent Specification is improved or modified in that a moulding material having a flexible or yielding character is moulded around the edges of the pleated filter cloth, side frame members (moulding members) used during the moulding operation being removed when the moulding material has set. The preferred moulding material is a synthetic elastomer resin. This provides the frame structure with a certain amount of flexibility permitting it to be more readily fixed to and mounted in position and ensures an enhanced degree of tightness when in position, thus avoiding leakages of air.

Various classes of moulded material may be used such as natural or synthetic rubber or a synthetic resin particularly, for example, flexible polyester resins or polyvinylchloride resins in the form of moulding compositions preferably including appropriate filling agents, for example, finely powdered activated calcium carbonate. The fillers utilised will of course be those which are compatible with the temperature which may be required for effecting curing of the resin. The filter cloth or other material is appropriately chosen in relation to the nature of the material from which the enclosing frame is formed and, more particularly, the curing temperature which may be necessary to ensure the production of appropriate properties. In general, where the moulding material has a natural or synthetic rubber base, relatively high curing temperatures may be involved and, in this case the choice of the filter cloth or other material is somewhat restricted in scope, as it must not be damaged by the curing to which the frame is subjected while the filter cloth or like material is in

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position.

One construction of a filter according to the present invention and a method of mounting it will now be described with reference to the example shown in the accompanying drawing, which is a sectional elevation of part of a filter and a clamp therefor.

The filter proper is marked 1 and it comprises a sheet of woven material of a suitable mesh size for the filter purpose intended, said cloth being of zig-zag form attached to support rods 2, the ends of which are embedded in a moulded open-ended frame 3 of moulding material having a flexible or yielding character; further the edges of the filter cloth 1 are likewise completely embedded in the frame 3 on all sides so that any fluid passing through the filter is forced to pass through the pores of the filter cloth 1 and thereby an efficient filtering action is secured. This construction of a filter element is described in the specification of my Patent Specification No. 781,194 save the framework 3 is, according to the present invention, of the said moulding material having a flexible or yielding character.

The filter element is preferably intended for mounting in a ventilating duct, and for this purpose it may be supported by any suitable clamp devices as also shown, for example, on the drawing in which an angle bracket 4 is provided, one arm of which is adapted to lie along the side of the duct and to be secured thereto, while the other arm serves as one support surface for the frame 3.

The said frame is pressed against the second arm of the angle member 4 by means of a clamp plate 5 bearing against the opposite side face of the frame 3 and pressed towards the latter by means of a clamping screw, for example of the character indicated in the drawing in which a clamp pin 6 has a recessed forward end adapted to be engaged, by a clip or fastener 7 while the opposite end of the pin 6 carries a wing nut 8 adapted to screw on the pin and to compress a spring 9 against the framework 5 so that the latter is pressed firmly against the frame 3. Forwardly directed nibs or pegs 10 may be provided on the angle member 4 and on the clamp plate 5 to locate the filter element in position, and a spring C-clip 11 may be provided on the pin 6 to prevent it being lost on disassembly of the filter.

The filter elements of filters formed in accordance with the present invention are performed at an elevated temperature to a sinuous or zig-zag form thus avoiding the need for spacer rods to support the filter

cloth. The pleats or folds formed in the filter cloth in this way may however be supported by transversely directed rods or like elements consisting of or coated with a thermoplastic material which may if desired be bonded or welded to the pleated cloth as described in my said Patent Specification No. 781,194. Instead of using rods of or coated with a thermoplastic layer strips of aluminium or other suitable material could be laid over and if desired bonded to the pleats or folds of the filter cloth by means of a suitable adhesive or the other features also described in my said Patent Specification No. 781,194.

#### WHAT I CLAIM IS :

1. A fluid filter as claimed in claim 1 of my Patent Specification No. 781,194 improved or modified in that the outer frame thereof is formed of a moulding material having a flexible or yielding character.

2. A fluid filter according to claim 1 herein, wherein the frame is formed from a natural or synthetic rubber, compounded and treated, so that the resulting product has the required properties.

3. A fluid filter according to claim 1 herein, wherein the frame is formed from a synthetic elastomer resin.

4. A fluid filter according to any of the foregoing claims, wherein the filter element proper comprises a sheet or sheets of filtering material such as cloth of zig-zag form having all its edges embedded in the frame of flexible or yielding character, said frame being adapted to be mounted in a duct and being gripped at said surrounding frame by means of presser surfaces urged resiliently one towards the other by spring means.

5. A fluid filter according to claim 4 wherein the cloth or fabric is wound around or attached to parallel spaced support rods the ends of which are embedded in the said surrounding frame.

6. A method of producing filters as claimed in claim 15 of my Patent Specification No. 781,194, improved or modified in that a moulding material having a flexible or yielding character is moulded around the edges of the pleated filter cloth, the frame members (moulding members) used during the moulding operation being removed when the moulding material has set.

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## PROVISIONAL SPECIFICATION

## Improvements in Fluid Filters

I, RAYMOND HERBERT EATON-WILLIAMS, a British Subject of 123 Southwood Lane, Highgate, London, N.6. do hereby declare this invention to be described in the following statement:—

The present invention relates to fluid filters including air filters, filters for liquids—and the like, of the type wherein a sheet of cloth, fabric or like material, preferably of sinuous or pleated form, is used as the filtering element, the unit so formed being held in a frame whereby the filter may be removed from or inserted as a unit in the equipment to which it is fitted.

Heretofore various arrangements of such filters have been described for example in my Patent Specification No. 781,194 and methods for producing one form of such filters have also been described in my Patent Specification No. 750,099. In general filters of the type concerned embody an outer frame which may be formed of metal or, as described in my Patent Specification No. 750,099, are formed at least in part of a moulded plastic material. Heretofore however such outer frames have been of a rigid character.

In accordance with the present invention a filter of the type referred to is provided with an outer surrounding or enclosing frame formed of a synthetic elastomer resin. This provides the frame structure with a certain amount of flexibility permitting it to be more readily fixed to and mounted in position and ensures an enhanced degree of tightness when in position, thus avoiding leakages of air.

Various classes of resin may be utilised particularly for example flexible polyester resins or polyvinylchloride resins in the form of moulding compositions including appropriate filling agents, for example finely powdered activated calcium carbonate. The fillers utilised will of course be those which

are compatible with the temperature which may be required for effecting curing of the resin.

The filters formed in accordance with the present invention may embody the features described in any of the aforesaid specifications. Thus in preferred forms of the present invention the edges of the filter cloth are deeply embedded in the mould framework and the latter may be produced in the manner described in my Patent Specification No. 750,099 utilising rigid support rods around which the filter cloth is arranged. Alternatively the filter cloth may be preformed at an elevated temperature to a sinuous or zig-zag form thus avoiding the need for spacer rods to support the filter cloth. The pleats or folds formed in the filter cloth in this way may however be supported by transversely directed rods or like elements, consisting of or coated with a thermoplastic material which may if desired be bonded or welded to the pleated cloth as described in my Patent Specification No. 781,194. Instead of using rods of or coated with a thermoplastic layer strips of aluminium or other suitable material could be laid over and if desired bonded to the pleats or folds of the filter cloth by means of a suitable adhesive or the other features described in my Patent Specification No. 781,194.

The present invention thus comprises a filter unit according to any of the aforesaid applications embodying the features described herein.

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